COMPARATIVE STUDY OF I-GEL WITH LARYNGEAL MASK AIRWAY FOR MINOR SURGICAL PROCEDURES UNDER TOTAL INTRAVENOUS ANAESTHESIA

STUDY OF 80 CASES

DISSERTATION SUBMITTED FOR THE DEGREE OF

DOCTOR OF MEDICINE

BRANCH – X (ANAESTHESIOLOGY)

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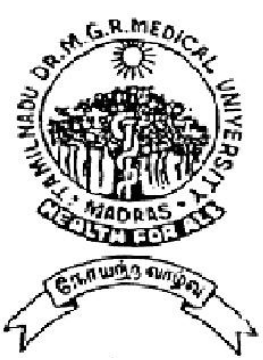

THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY

CHENNAI,

TAMILNADU

BONAFIDE CERTIFICATE

This is to certify that this dissertation entitled **"COMPARISON OF I-GEL AND LARYNGEAL MASK AIRWAY FOR MINOR SURGICAL PROCEDURES UNDER TOTAL INTRAVENOUS ANAESTHESIA"** is a bonafide record work done by **Dr. H.VIJAYALAKSHMI** under my direct supervision and guidance, submitted to the TamilNadu Dr. M.G.R. Medical University in partial fulfillment of University regulation for MD, Branch X – Anesthesiology.

DR. SP. MEENAKSHISUNDARAM, M.D,DA.,

DIRECTOR, i/c.

INSTITUTE OFANAESTHESIOLOGY,

MADURAI MEDICAL COLLEGE &

GOVERNMENT RAJAJI HOSPITAL,

MADURAI.

DECLARATION

I **Dr H. Vijayalakshmi,** solemnly declare that this dissertation titled **"COMPARISON OF I-GEL AND LARYNGEAL MASK AIRWAY FOR MINOR SURGICAL PROCEDURES UNDER TOTAL INTRAVENOUS ANAESTHESIA"** has been done by me. I also declare that this bonafide work or a part of this work was not submitted by me or any other for any award, degree, diploma to any other University board either in India or abroad.

This is submitted to The TamilNadu Dr. M. G. R. Medical University, Chennai in partial fulfillment of the rules and regulation for the award of Doctor of Medicine degree Branch –X (Anesthesiology) to be held in April 2011

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CONTENTS

INTRODUCTION

The endotracheal intubation has a long history as one of the most widely accepted techniques in anesthetic practice, but it is not without complications, most of which arises from the need to visualize and penetrate the laryngeal opening.

The laryngeal mask was designed primarily as a means of offering some of the advantages of endotracheal intubation while avoiding a fundamental disadvantage of visualization of the vocal cords and forcing them apart.

The laryngeal mask airway has revolutionized the management of patients who would previously have received anesthesia by facemask enabling the anesthetist to both hands free. The increasing emphasis on “day care anesthesia” has led to greater use of laryngeal mask airway, I-gel as an alternative to face mask and in some cases for conventional tracheal intubation.

Today the ubiquitous use of laryngeal mask airway and similar supraglottic devices provides new possibilities in the approach to the airway.

Supraglottic devices, in particular the laryngeal mask airway and the combitube have been recommended as rescue airways in “cannot intubate, cannot ventilate” scenario. The laryngeal mask airway has been recommended at five places in the ASA task force algorithm on the

management of the difficult airway either as a ventilating device or as a conduit for endotracheal intubation.

The primary disadvantage of classic laryngeal mask airway is the high incidence of gastric insufflations and aspiration.

I-gel is a relatively new supraglottic airway device with a drain tube to minimize the risk of gastric insufflations and aspiration. I-gel is a supraglottic airway device with greater stability while positioning, high seal pressure, has high success rate at first insertion.

The present study is carefully designed with utmost care to compare I-gel and laryngeal mask airway in patients undergoing minor surgical procedures under total intravenous anaesthesia.

AIM OF THE STUDY

The aim of my study is to compare the insertion of laryngeal mask airway and I-gel in patients undergoing minor surgical procedures under total intravenous anaesthesia.

To compare

- The time of insertion,
- Number of attempts,
- Airway seal pressure,
- Oxygen saturation,
- Airway manipulation if needed, and
- To assess the side effects if any.

AIRWAY MANAGEMENT

Introduction

The major responsibility of the anesthesiologist is to provide adequate respiration for the patient. Often in the absence of a fibreoptic scope unconventional or alternative methods are used to secure the airway with success. Success of any such technique depends upon constant maintenance of an unobstructed airway and sufficient satisfactory depth of anesthesia during the airway manipulation.

Airway assessment

Prediction of difficult airway is done by physical examination indices, radiological indices, and advanced indices. History of snoring, apnoea, daytime somnolence and stridor may be indicative of airway obstruction, which may be exaggerated after induction. Physical examination should include evaluation of the size and shape of head, gross facial features, size and symmetry of mandible, size of tongue, prominence of upper incisors and range of motion in jaw, head and neck.

Anaesthetic techniques

Intravenous induction

Targeting an adequate plane of anaesthesia without compromising spontaneous ventilation is difficult with intravenous induction agents. Propofol provides rapid awakening and blunts airway reactivity. It is a good

drug that permits a quick assessment of the laryngoscopic airway grade. In addition a better control of the airway can be achieved with Laryngeal mask airway (LMA) insertion under Propofol. The main disadvantage is the risk of apnoea, which warrants extremely careful titration of an effective dose.

Inhalational Induction

In patient with difficult but "uncompromised airway" inhalation induction is by far the preferred choice. The success of inhalation induction will depend upon the maintenance of airway patency throughout induction and ensuring adequate depth of anaesthesia before airway manipulation.

Halothane is the agent of choice. Sevoflurane can also be used but because of its low solubility the depth of anaesthesia rapidly diminishes during laryngoscopy. However, rapid recovery is one of the features that can be of immense advantage in a patient who develops airway obstruction following induction. The depth of anaesthesia can be maintained if inspired agent concentration is sufficient to offset the dilutional effects of room air. The advantage of this technique is that spontaneous ventilation is preserved during airway instrumentation.

In patients with difficult airway, awake intubation is often the primary approach of airway management with adequate application of local anaesthetics to the airway. It is important to preserve spontaneous ventilation in these patients. The advantages of awake intubation are preservation of

normal airway tone and respiratory efforts. The disadvantages are a struggling patient, increased haemodynamic responses and the risk of raise in intracranial pressure.

Topical anaesthesia

Topical anaesthesia of airway improves patient's acceptance of an airway device and blocks airway reflexes. It can be used in conjunction with either inhalational or intravenous induction once sufficient anaesthetic depth is reached for the patient to tolerate laryngeal stimulus. Lignocaine 10% spray is highly effective and care should be taken not to exceed the toxic dose limit. Nebulized lignocaine is particularly useful and can be used preoperatively or during induction.

Rigid laryngoscopy

The key for success with conventional rigid laryngoscopy includes appropriate positioning, proper equipment selection, meticulous technique, minimal number of attempts and optimal external laryngeal manipulation (OELM). Ideal position for intubation is sniffing of morning air position to align the oral, pharyngeal, laryngeal axes. A small foam pillow or several folded sheets are used to maintain flexion in the lower cervical spine. The patient should be optimized with premedication.

Blind nasal intubation

A well lubricated softened endotracheal tube (ETT) is introduced into a nostril. The left nostril is preferred as the leading edge stays in midline in hypopharynx, if right nostril is used the leading edge frequently hitches the right vallecula. The endotracheal tube is directed into glottis by hearing for breath sound, or by capnograph trace. Successful placement often will need manipulation of endotracheal tube patients head and the larynx. A stylet with 30º angle can be placed into endotracheal tube after it is placed in nasopharynx. Posterior manipulation of stylet will displace the distal end of endotracheal tube anteriorly and into the glottis. Higher failure rates are found in patients with mid facial hypoplasia.

Retrograde intubation

This method has been used in anticipated or unanticipated difficult airway after convention intubation strategies failed.

Tactile technique

Nasal or oral intubation can be accomplished using this technique. It depends upon palpating epiglottis by second and third fingers inserted through patient's mouth. Once epiglottis is palpated the tube can be guided into the glottis by the fingers.

Light wand

Light wand can be used for orotracheal or nasotracheal intubation. Transillumination is used as a guide for intubation. Tracheal placement results in well circumscribed bright glow where as oesophageal placement results in diffuse glow. Complications of light wand include pharyngeal trauma, arytenoid dislocation.

Transtracheal jet ventilation (TTJV)

TTJV is the percutaneous insertion of a catheter into the trachea through cricothyroid membrane and ventilation is achieved using jet ventilation. .

TTJV is employed as an emergency airway. Complications are subcutaneous emphysema, bilateral pneumothorax, inadvertent placement into oesophagus and sub mucosal false passage in trachea.

Cricothyrotomy

It is procedure of choice for emergency access of airway in all patients regardless of age, when conventional means of airway control fails.

Postoperative airway problems

Most commonly occurring post operative airway problems include,

1. Inability to tolerate extubation.
2. Laryngospasm.
3. Aspiration.

4. Mucosal lacerations in airway

5. Arytenoids dislocation

6. Dental and temporomandibular joint trauma.

Inability to tolerate extubation

Inability to tolerate extubation may occur commonly due to airway obstruction or due to hypoventilation syndromes. It should be borne in mind that extubation has a potential of leading to a reintubation.

Extubation in fully awake condition and/or with reintubation guides in situ avoids most of the catastrophic airway complications in the early postoperative period.

Laryngospasm

The factors associated with increased risk of laryngospasm are presence of nasogastric tube, oral endoscopy surgeries, during extubation. Inadequate anaesthetic depth is an important factor contributing to laryngospasm during extubation done in lighter planes. Laryngospasm occurs in response to glottis or supraglottic mucosal stimulation involving apposition of structures at three levels

1. Supraglottic folds.

2. False vocal cords.

3. True vocal cords.

Fink proposed a dual mechanism for closure of larynx. Firstly, a shutter effect can be seen due to the closure of the vocal cords, which in turn leads to increase in translaryngeal pressure gradient. The soft tissues of the supraglottic region become rounded and redundant due to the shortening of thyrohyoid muscle, drawn into the laryngeal inlet (Ball valve effect). Stridor gets manifested due to intermittent closure of glottis.

Prevention

Prevention is the ideal remedy. Patients with known risk factors may be given intravenous lignocaine 2 mg/kg given slowly over a period of 30 sec, one min before extubation. To derive any benefit from lignocaine administration, extubation should be done before signs of swallowing activity appear. Another preventive measure proposed is application of local anaesthetic agents to the supraglottic mucosa.

Management

Incomplete obstruction is associated with audible inspiratory or expiratory sound, if obstruction progresses tracheal tug, paradoxical respiratory movements of chest and abdomen develop. Once complete obstruction develops audible sounds cease. The primary concern during laryngospasm is oxygenation of the patient and not intubation. Several therapeutic maneuvers have been suggested.

1. Removal of the irritant stimuli like debris from larynx.

2. Forward jaw thrust at the temporomandibular joint by applying pressure on the ascending rami of mandible. This maneuver lengthens the thyrohyoid muscle and unfolds the soft supraglottic tissue.

3. Facilitate ventilation by applying gentle continuous positive airway pressure with 100% oxygen by a tight fitting face mask.

Any measure of laryngoscopy and intubation attempt may turn incomplete obstruction to complete one. If these methods do not help and if the patient remains hypoxic, Succinyl choline 0.5 mg/kg relieves laryngospasm. In the event of bradycardia, atropine should be administered concomitantly ensuring adequate oxygenation with 100% oxygen through a tight fitting face mask.

SUPRAGLOTTIC AIRWAY DEVICES

Supraglottic Airway devices ventilate patients by delivering anesthetic gases/ oxygen above the level of the vocal cords. They are designed to overcome the disadvantages of endotracheal intubation such as damage to soft tissue, tooth, vocal cords, laryngeal and tracheal damage, exaggerated hemodynamic response, barotrauma etc. The advantages of the supraglottic airway devices include

- Avoidance of laryngoscopy,
- Less invasive to the respiratory tract,
- Better tolerated by patients,
- Increased ease of placement,
- Improved hemodynamic stability in emergence,
- Less coughing, less sore throat,
- Hands free airway and
- Easier placement even by inexperienced personal.

(1) The American Society of Anesthesiologist's Task Force on Management of the Difficult Airway suggests considering the use of the supraglottic airway devices (as Laryngeal Mask Airway and the Combitube) when intubation problems occur in patients with a previously unrecognized difficult airway, especially in a "cannot ventilate, cannot intubate" situation.

(2) The European Difficult Airway Society suggests using the Laryngeal Mask Airway or the Intubating Laryngeal Mask, in an unanticipated difficult tracheal intubation.

Laryngeal Mask Airway

The Laryngeal Mask Airway (LMA), originally described by Brain has been described as the missing link between the facemask and the tracheal tube and it has gained widespread popularity. The laryngeal mask airway consists of two parts, the tube and the mask. Made of medical grade silicone, it can be autoclaved and reused many times. It is designed to provide an oval seal around the laryngeal inlet.

Laryngeal mask airway was first used at Royal Hospital London, UK, in 1981 and since its introduction in clinical practice it has been used in more that 100 million patients worldwide with no reported death.

LARYNGEAL MASK AIRWAY

HISTORY AND CONCEPTS

Dr.A.I.J.Brain viewed the mechanical aspects of endotracheal intubation in which an artificial tube is inserted into the trachea, the natural tube, and a cuff being inflated to form a gas tight seal. He found that in engineering terms, this solution to the problem of forming a gas tight junction between two tubes is rather unsatisfactory, since it necessarily involves a degree of constriction at the point of junction unless the outer tube [trachea]

itself is expanded to compensate. He felt, ideally, it is desirable that both tubes are of same internal diameter at the point of their junction, since this has clear advantages in terms of gas flow without constriction in the tubes. This involves connecting them to end since the option of expanding the anatomical tube [trachea] is not practicable.

Based on the above concepts of the airway, Dr.Brain tried to produce an airway, which directly faces the larynx yet it should provide a airtight seal. He examined the postmortem specimens of adult male and female larynx to assess such a joint might be achieved .He examined the shape of the pharynx by making plaster of Paris casts from these specimens [cadavers].He noted that an airtight seal could be effective against the perimeter of the larynx posteriorly by an elliptical cuff inflated in the hypopharynx. This concept led to the concept of laryngeal mask airway.

THE PROTOTYPE OF THE LARYNGEAL MASK

A prototype of the laryngeal mask was constructed by Dr.Brain, by forming a shallow mask with an inflatable rubber cuff joined to a tube communicating with the lumen of the mask at right angles. The rubber cuff of a Goldman paediatric dental mask was stretched onto the diagonally cut endotracheal end of portex 10 mm clear plastic tube and fixed in position using acrylic glue. The resulting apparatus resembles a spoon. A means of inflating elliptical cuff was provided by re-routing the pilot tube used to

inflate the endotracheal cuff. The pilot tube was provided with non –return valve.

Dr.Brain invented this prototype of laryngeal mask in the year 1981 based on cast model of the hypopharynx and in the same year he used this prototype in a patient for the first time. Brain confirmed in cadavers that the prototype was long enough to encircle the larynx, because the length between the tip of the mask and the upper border of the mask aperture was always longer than that of between the upper border of thyroid cartilage and lower border of cricoid cartilage. Laryngeal mask airway has revolutionized difficult airway management. Laryngeal mask airway has been successfully used in patients in whom ventilation or intubation are extremely difficult or impossible.

Laryngeal mask airway is available in eight sizes for use in patients. The available sizes are 1, 1.5, 2, 2.5, 3, 4, 5, 6. A laryngeal mask airway that is too small will not form a tight seal and may be difficult to use if positive pressure ventilation is required. Numerous methods are described for placing the laryngeal mask airway in patients. It includes the technique using a midline or slightly diagonal approach with the cuff fully deflated, 180 degree technique, partial inflation technique, thumb insertion technique.

INSERTION TECHNIQUES

1. Standard technique:

It includes a midline or slightly diagonal approach with the cuff fully deflated. The head should be extended and the neck flexed. This position is best maintained during insertion by using the noninserting hand to stabilize the occiput.

2. 180-degree technique:

Laryngeal mask airway is inserted with the laryngeal aperture pointing cephalad and rotated to 180 degrees as it enters the hypopharynx. A distinct pop will be felt by the introducing hand.

3. Partial inflation technique:

In this technique the cuff is partially or fully inflated before insertion.

4. Thumb insertion technique:

This technique is more suitable for patients where access to the head from behind is difficult or impossible. The laryngeal mask airway is held with the thumb in the position occupied by the index finger in standard technique.

ANATOMICAL POSITION OF THE LARYNGEAL MASK AIRWAY

When the mask is placed correctly, the distal part of the mask occupies the hypopharynx and the tip rests on the upper esophageal sphincter at the level of the sixth or seventh cervical vertebra.

Thus the distal part of the mask lies posterior to the thyroid cartilage and the tip of the mask lies at the level of cricoid cartilage. The sides of the mask lie at the mask face into the pyriform fossae. The proximal edge of the mask is under the base of the tongue below the level of tonsils. When the tube is fixed properly, the curve of the tube should follow that of the palate. The epiglottis is either positioned in the aperture of the mask being prevented from occlusion by the vertical bars or compressed by the upper part of the mask.

After insertion the cuff should be inflated over 3to5 seconds without holding the tube unless the position is obviously unstable. It is rarely necessary to use the full volume. Using greater than recommended volumes will not improve the seal against the larynx but it may worsen it. It is ideal to inflate the mask with half the maximum inflation volume and adding volume by determining the leak pressure.

Cuff volume, used in various sizes of laryngeal mask airway are as follows:

Laryngeal mask airway size	Weight of the patient kgs	Maximum cuff volume ml
1	≤ 5	4
1.5	5-10	7
2	10-20	10
2.5	20-30	14
3	30-50	20
4	50-70	30
5	70-100	40
6	>100	50

Advantages of Laryngeal mask airway over Endotracheal Tube:

1. Placement of laryngeal mask airway is easier when compared to intubation
2. Laryngeal mask airway is a relatively non-invasive airway when compared to tracheal tube
3. The respiratory system is less disturbed because the cords are not penetrated
4. The hemodynamic changes, intracranial and intraocular pressure changes are less during laryngeal mask airway insertion than during intubation.

5. The resistance to airflow is less in the laryngeal mask airway than that of corresponding tracheal tube.
6. Less anesthetic depth is required.
7. Insertion of laryngeal mask airway does not cause significant bacteremia when compared to nasal intubation.
8. Incidence of sore throat and subsequent respiratory tract infection is less when compared to tracheal tube

Complications:

1. Accidental dislodgement can occur
2. Airway obstruction and airway injury
3. Nerve Injury - Palsies of hypoglossal, recurrent laryngeal and lingual nerves have been reported after the use of laryngeal mask airway.

Indications:

1. It includes routine, elective cases where tracheal intubation is not required or is required only because the surgery interferes with maintenance of the airway with a face mask.
2. It is useful in cases where maintenance of airway with a face mask is difficult such as edentulous patients, facial injuries or burn.
3. Useful in elective eye surgeries since changes in intraocular pressure are smaller when compared to intubation.

Laryngeal mask airway is not an ideal airway device because the low-pressure seal may be inadequate for positive pressure ventilation, and it does not protect the lungs from the gastric contents regurgitated into the pharynx. In an attempt to overcome these disadvantages the Proseal laryngeal mask airway was developed.

Proseal Laryngeal Mask Airway

The Proseal Laryngeal Mask Airway (PLMA) is a new Laryngeal Mask Airway with a modified cuff designed to improve its seal and a drainage tube for gastric tube placement. It was introduced in the year 2000. It separates the airway and oesophagus more completely than the classic laryngeal mask airway. The stem consists of two separate tubes; an additional posterior cuff [not present in pediatric sizes] applies more firmly around the larynx so that inflation pressures of 30 cm/H_2O may be applied.

These features are designed to improve safety of the laryngeal mask airway and broaden its scope especially when used with positive pressure ventilation. It is a reusable device; the cuff is made of a softer material than the laryngeal mask airway Classic and is designed to conform to the contours of the hypopharynx. While the laryngeal mask airway ProSeal may be used with spontaneously breathing patients, it is designed for use with positive pressure ventilation with or without muscle relaxants. It effectively separates the gastrointestinal and respiratory tracts, improve

airway seal, and enable good ventilation. One of its main features is the presence of gastric access tube. Provision of this tube may help to empty air insufflated stomach in patients with difficult mask ventilation. The maximum airway seal pressure will vary between patients, but is on average 10 cm H2O higher than the laryngeal mask airway Classic or up to 30 cm H2O. However, it is more difficult to insert as the laryngeal mask airway unless an introducer tool is used.

ADVANTAGES OF PROSEAL LARYNGEAL MASK AIRWAY OVER CLASSIC LARYNGEAL MASK AIRWAY

- A High seal pressure - up to 30 cm H_20 - Providing a tighter seal against the glottic opening with no increase in mucosal pressure can be used
- A softer silicone cuff of the ProSeal laryngeal mask airway reduces the likelihood of throat irritation and stimulation
- ProSeal laryngeal mask airway provides more airway security
- Enables use of positive pressure ventilation in those cases where it may be required - transient or extended, planned or unplanned
- A built-in drain tube designed to channel fluid away and permit gastric access for patients with gastro esophageal reflux disorders. There by reduces the risk of aspiration

- Ability to realize the benefits of spontaneous ventilation more often.
- Insertional tool can be used as an option
- The ProSeal laryngeal mask airway (PLMA) achieves a more effective seal than the laryngeal mask airway classic (cLMA) and isolates the glottis from the esophagus when correctly placed and can be used during laparoscopic surgery.

The flexible reinforced laryngeal mask airway (RLMA) resists kinking and can be positioned to minimize interference with surgical procedures involving head and neck. It is available in sizes 2–5. It is slightly difficult to insert compared to classical laryngeal mask airway. It is particularly useful in patients with difficult airway undergoing head and neck surgeries.

Fastrach – Intubating Laryngeal Mask Airway

Fastrach, a modification of the laryngeal mask airway is in use from 1997; designed as a conduit for tracheal intubation, it has a success rate for endotracheal intubation of approximately 93%. It has an epiglottic elevator bar at the mask aperture and a rigid (stainless steal) anatomically curved shaft that follows the anatomical curve of the palate and the posterior pharyngeal wall.

Portex Soft Seal Laryngeal Mask

The single use Portex Soft Seal Laryngeal Mask is a new supraglottic device similar to the single-use laryngeal mask airway –unique. The difference between the two devices consists in the design of the ventilation orifice of the Portex Soft Seal Laryngeal Mask, as well as its more elliptical cuff. The ventilation orifice of the Portex Soft Seal Laryngeal Mask is wider and it is characterized by the absence of mask aperture bars.

I-GEL

I-gel is a new single-use, noninflatable supraglottic airway for use in anesthesia during spontaneous or intermittent positive pressure ventilation. To reduce the limitations of currently available supraglottic airway devices like laryngeal mask airway -ProSeal (eg. high cost, demand for careful handling to prevent cuff damage and relative difficulty of insertion) a new and cheaper supraglottic airway device "I-gel" has been developed.

I-gel airway is an anatomically designed mask made of a gel-like thermoplastic elastomer called SEBS (Styrene Ethylene Butadiene Styrene).

The soft, non-inflatable cuff fits snugly onto the perilaryngeal framework, mirroring the shape of the epiglottis, aryepiglottic folds, pyriform fossae, perithyroid, peri-cricoid, posterior cartilages and spaces. Thus each structure receives an impression fit, thus supporting the seal by enveloping the laryngeal

inlet. The seal created is sufficient for both spontaneously breathing patients and for intermittent positive pressure ventilation.

The tensile properties of the I-gel bowl, along with its shape and the ridge at its proximal end, contribute to the stability of the device upon insertion. Upon sliding beneath the pharyngo-epiglottic folds it becomes narrower and longer, creating an outward force against the tissues. The ridge at the proximal bowl catches the base of the tongue, also keeping the device from moving upwards out of position (and the tip from moving out of the upper esophagus) I-gel does not have any epiglottic/aperture bars like some other supraglottic devices.

I-gel has an artificial epiglottis called the 'epiglottis blocker' which prevents epiglottis from down-folding. But in case epiglottis does down-fold, the airway channel exits so deeply into the bowl of the cuff that there is no danger of the epiglottis interfering with the fresh gas flow. The outer cuff shape ensures that blood flow to surrounding tissue is maintained and reduces the neuro vascular compression of nerves.

The device has a buccal cavity stabilizer which adapts its shape to oropharyngeal curvature of patient. It is anatomically widened and concaved to eliminate the potential for rotation, thereby reducing the risk of malposition. The buccal cavity stabilizer has airway tubing and the gastric channel. The device has an integral bite bock which acts as a guide to depth of insertion. The gastric channel allows suction, detection of leak and passage of gastric tube. The buccal cavity stabilizer has a widened, elliptical, symmetrical and laterally

flattened cross sectional shape ,providing good vertical stability upon insertion which is an advantage over laryngeal mask airway with inflatable cuffs where mechanical inflation can cause movement of the device because the distal wedge shape of the mask is forced out of the upper oesophagus. The firmness of the tube section and its natural oropharyngeal curvature allows the device to be inserted by grasping the proximal end of I-gel and helps to glide the leading edge against the hard palate into the pharynx. It is not necessary to insert fingers into the mouth of the patient for full insertion. I-gel is said to have easier insertion, stability after insertion, minimal risk of tissue compression. It is a latex free supraglottic device.

ADVANTAGES OF IGEL

1. First time insertion rate is higher and insertion time is faster
2. Easy to insert
3. High seal pressure
4. Minimal risk of tissue compression
5. Easy ventilation of chest without air leak during chest compression

Esophageal-Tracheal Combitube

The Esophageal-Tracheal Combitube (ETC) is a double lumen/ double balloon supraglottic airway device which can be easily inserted and allows for ventilation independent of its position either in the esophagus or the

trachea. Blind insertion results in successful esophageal intubation in nearly all patients. The major indication of the Esophageal –Tracheal combitube is an excellent option for rescue ventilation in both in and out of the hospital environment, as well as in immediate life threatening cannot ventilate, cannot intubate situations. It is a back-up device for airway management. The advantages of the Combitube include rapid airway control without the need for neck or head movement, minimized risk for aspiration, firm fixation of the device after inflation of the oropharyngeal balloon and that it works equally well in either tracheal or esophageal position.

EasyTube

The EasyTube is new disposable, polyvinyl chloride, double-lumen, latex-free, supra-glottic airway device. It has a close design to the Combitube, intended to be friendlier to use. It allows ventilation in either esophageal or tracheal position; however it is expected to enter the esophagus in most cases. However, the EasyTube had a better fiberoptic view and a shorter time to achieve an effective airway, with similar ventilatory performances with the combitube.

Laryngeal Tube

The Laryngeal Tube (LT) is a multiuse, latex-free, single-lumen silicon tube and consists of an airway tube with an approximate angle of 130º, an average diameter of 1.5 mm and two low pressure cuffs (proximal

and distal) with two oval apertures placed between them which allows ventilation. The distal balloon (esophageal balloon) seals the airway distally and protects against regurgitation. The proximal balloon (oropharyngeal balloon) seals both the oral and nasal cavity. When the Laryngeal tube is inserted, it lies along the length of the tongue, and the distal tip is positioned in the upper esophagus. During ventilation, air passes into the pharynx and from there over the epiglottis into the trachea

since the mouth, nose and esophagus are blocked by the balloons. A new single use version of the Laryngeal tube has been recently introduced in the market.

Laryngeal Tube Suction

The newly introduced Laryngeal Tube Suction is a further development of the Laryngeal Tube which allows better separation of the respiratory and alimentary tracts. The Laryngeal tube suction is a latex-free, double lumen silicon tube wherein one lumen is used for ventilation and the other for decompression, suctioning and gastric tube placement.

Perilaryngeal Airway – Cobra

The Perilaryngeal –Airway COBRA (PLA) is a single use, latex free supraglottic airway device, designed to be positioned in the hypopharynx opposite to the laryngeal inlet. It has a breathing tube with a large inner diameter to increase air flow. In the proximal end it has a standard 15 mm

connection and in the distal end a ventilatory hole which is surrounded by a novel head design. The novel head design facilitates ventilation through the slotted openings that prevents the soft tissue and the epiglottis to obstruct the ventilatory hole. Above the head, the device has a balloon surrounding the tube like a ring. This balloon when inflated closes the nasopharynx and pushes the roof of the tongue anteriorly, preventing air leakage. Perilaryngeal airway offers a more effective seal, and a better fiberoptic score as the laryngeal mask airway.

Slipa - Streamlined Pharynx Airway Liner

The SLIPA is a hollow, preformed, soft plastic, blow-molded, boot-shaped airway, which lines the pharynx. No cuff is necessary for the device to seal in the pharynx because the shape of the SLIPA is similar to that of a pressurized pharynx.

Elisha

The Elisha's uniqueness consists of its ability to combine three functions in a single device: ventilation, intubation (blind and/or fiberoptic-aided) without interruption of ventilation, and gastric tube insertion. It has three separate channels for ventilation, intubation, and gastric tube insertion.

The ventilation channel (VC) and the intubation channel (IC) are side-by-side, whereas the gastric tube channel (GTC) has an outlet located in the distal end of the device. The VC and the IC have a partitioning wall between

them, but join at the ventilation outlet situated in front of the laryngeal inlet. The VC has a standard 15 mm connector located on the proximal end of the device. The IC allows passage of an 8.0 mm ID endotracheal tube (ET) for blind or fiberoptic-guided intubation. The EAD has two high-volumes, low-pressure balloons: a proximal balloon which seals the oropharynx and nasopharynx and a distal balloon which seals the esophagus. Both balloons are inflated through a single pilot port with 50 cc of air resulting in an intra-balloon pressure of approximately 70 cm H_2O.

MAINTENANCE OF ANAESTHESIA WITH LARYNGEAL MASK AIRWAY OR I-GEL

Both spontaneously breathing and intermittent positive pressure ventilation can be achieved through the laryngeal mask or I-gel. Although patients can tolerate the presence of mask under light anaesthesia, anaesthesia should be maintained deep enough to suppress airway reflexes. During the procedure airway patency and correct orientation of the device should be verified at regular intervals .The patients upper abdomen should be periodically inspected for signs of distension and epigastric auscultation performed.

A sudden increase in leakage, snoring or other sounds often signals the need for more muscle relaxation. If regurgitation occurs the first sign may be the appearance of fluid traveling up the laryngeal mask tube. Breath holding

or coughing can occur. The patient should be placed in head down position, the breathing circuit should be disconnected and the airway tube suctioned.

REMOVAL OF THE LARYNGEAL MASK AIRWAY OR I-GEL

The laryngeal mask should be removed in a deep level of anaesthesia or after full recovery of protective reflexes. Patients should not be stimulated until they recover spontaneously from anaesthesia. Leaving the laryngeal mask airway in position until airway reflexes have recovered and the patient can open his or her mouth on command, will ensure maintenance of a secure airway.

Laryngeal mask airway should not be removed during lighter plane of anaesthesia. If reflexes are not adequately recovered coughing laryngospasm or gagging can occur.

Care and Cleaning

As soon as possible after use the reusable laryngeal mask airway should be gently cleaned with warm water and a dilute sodium bicarbonate solution until all visible material has been removed. The solution of bicarbonate will help to dissolve secretions. A pipe cleaner –type brush should be inserted through the distal aperture to clean out the shaft, taking care not to damage the bars. The laryngeal mask airway should be rinsed in tap water to remove residue and then dried and placed in a pouch.

Water should not be allowed to enter the cuff. Autoclaving laryngeal mask airway with water in the cuff may cause irreversible damage .To remove fluid from the cuff without damaging laryngeal mask airway the cuff should be emptied with the cuff uppermost and manually squeezed .

As much as air as possible should be removed from the cuff shortly before autoclaving .Laryngeal mask airway can be autoclaved at temperatures upto 135˚c.Higher temperature can cause the tube to become brittle and fragment. The device should be allowed to cool to room temperature after sterilization. Autoclaving impairs the bond between the connector and the tube but not its air tightness.

The World Health Organization guidelines indicate that the laryngeal mask airway cleaning and sterilization procedures discussed are sufficient to inactivate conventional pathogens such as bacteria, fungi and viruses. In patients known or suspected to have a transmissible spongiform encephalopathy, it is recommended that the device should be destroyed after use. Liquid chemical agents such as glutaraldehyde, phenol-based cleaners or quaternary ammonium compounds or ethylene oxide should not be used to clean laryngeal mask airway. They are adsorbed onto silicone and can cause pharyngitis and laryngitis as well as shorten the life of the device.

REVIEW OF LITERATURE

1. Amr M Helmy, et al ,in 2010 from the Department of Anaesthesiology and Intensive care ,Faculty of Medicine ,Suez canal university, Ismailia, Egypt did a comparative study in 80 patients between I-gel, a new supraglottic airway device, and classical laryngeal mask airway in anesthetized spontaneously ventilated patients and parameters like easiness of insertion, leak pressure, end tidal co2,oxygen saturation, postoperative complications were noted. They concluded both groups did not cause any significant alteration in hemodynamic status of patients. Insertion of I-gel was easier and more rapid than insertion of laryngeal mask airway. Leak pressure was higher with I-gel than laryngeal mask airway and thus incidence of gastric insufflation was significantly lower with I -gel.

2. Francksen H from Department of Anaesthesiology and Intensive Care Medicine, Kiel, Germany studied two disposable devices the newly developed supraglottic airway device I-gel and the laryngeal mask airway -Unique in routine clinical practice. Eighty patients undergoing minor routine gynaecologic surgery were randomly allocated to have I-gel or laryngeal mask airway - Unique. Oxygen saturation, end-tidal carbon dioxide, tidal volume and peak airway pressure were recorded, as well as time of insertion, airway leak pressure, postoperative sore-throat, dysphonia and dysphagia for each device. Time of insertion was comparable with I-gel and the laryngeal mask airway -

Unique. There was no failure in the I-gel group and one failure in the laryngeal mask airway -Unique group. Ventilation and oxygenation were similar between devices. Mean airway pressure was comparable with both devices, whereas airway leak pressure was significantly higher in the I-gel group compared with the laryngeal mask airway -Unique group. Fiberoptic score of the position of the devices was significantly better in the I-gel group. Post-operative sore-throat and dysphagia were comparable with both devices. Both devices appeared to be simple alternatives to secure the airway. Significantly higher airway leak pressure suggests that the I-gel may be advantageous in this respect.

3. Beylacq L from Hospital des enfants cedex, France in 2009 conducted an observational study in fifty children above 30 kgs and concluded that because I-gel has a very good success rate and very few complications it seems to be an efficient and safe device for pediatric airway management.

4. Amini S, from Department of Anaesthesiology and critical care , Zahedan, Iran in 2010 compared the performance of the Intersurgical Solus laryngeal mask airway (LMA) with that of the i-gel during general anaesthesia with respect to oropharyngeal leak pressure, peak airway pressure, airway manipulation, insertion time, fiberoptic view, ventilatory parameters, and peri-operative complications. The leak pressure was significantly higher in the laryngeal mask airway group than the I-gel group. Both devices have good performance with very low peri-operative complications. However, the Solus

laryngeal mask airway provides a better oropharyngeal seal, provides a better fiberoptic view, and requires less manipulation to secure the airway than the I-gel.

5. Ashish Kannaujia from S.N.Medical College, Agra 2009 conducted a study in 120 patients to determine the ease of insertion, time to achieve effective airway, oropharyngeal seal pressure and airway stability on head and neck movement**.** Median insertion time of 11sec .Oropharyngeal seal pressure was 20 cm H20. No significant adverse event was noted in any of the patient in perioperative period. I-gel is a simple, excellent and easy to use supraglottic device. The device is very effective and useful for adult patients requiring surgical procedures of 30-60 minutes duration while breathing spontaneously.

6. J.J.Catward in 2008 studied I-gel in elective, anaesthetized patient's assessing ease of use, airway quality, positioning, seal and complications. Other complications and patient side-effects were mild and few. I-gel is easily and rapidly inserted, providing a reliable airway in over 90% of cases. Further studies are indicated to assess safety and performance compared to other supraglottic airway devices.

7. Parul Jinda, Himalayan Institute of Medical Sciences, Dehradun in 2009

concluded that I-gel effectively conforms to the perilaryngeal anatomy despite the lack of an inflatable cuff; it consistently achieves proper positioning for

supraglottic ventilation and causes less hemodynamic changes as compared to other supraglottic airway devices.

8. Ishwar Singh, Jaipur Golden Hospital, New Delhi, India conducted a study comparing the efficacy of I-gel and ProSeal laryngeal mask airway in elective surgeries. Sixty ASA grade I& II adult patients of either sex were randomly assigned into two groups and the airway sealing pressure, ease of insertion, success rate of insertion, ease of gastric tube placement, airway trauma by post operative blood staining of the device, tongue, lip and dental trauma, hoarseness, regurgitation / aspiration were assessed. The airway sealing pressure was higher with Group P than with Group I but the airway sealing pressure of Group I was very well within the normal limit to prevent aspiration. The ease of insertion was more with Group I than with Group P. The success rate of first attempt of insertion and ease of gastric tube placement was more with Group I. Blood staining of the device& tongue, lip and dental trauma was more with Group P. There was no evidence of bronchospasm, laryngospasm, regurgitation, aspiration or hoarseness in either group. To conclude I-gel is a novel supraglottic device with an acceptable airway sealing pressure (25.27 cm H_2O). It is easier to insert, requires less attempts of insertion, has easier gastric tube placement and is less traumatic as compared to laryngeal mask airway - ProSeal.

MATERIALS AND METHODS

This study was conducted in the elective operating theatres of Govt. Rajaji hospital, attached to Madurai medical college, Madurai. Ethical committee approval and written consent were obtained. This study was conducted during the period April 2009 to June 2010. Supraglottic airway devices laryngeal mask airway and I-gel were compared as I-gel is a newly introduced and easier insertion device available.

Inclusion criteria:

- ASA I-II,
- Age 20-60 yrs
- Weight 40-60 kgs,
- Undergoing minor surgical procedures under total intravenous anaesthesia.

Exclusion criteria:

- Patients with a known or predicted difficult airway
- At risk of aspiration or pulmonary aspiration of gastric contents
- Pathology of neck, upper respiratory or upper alimentary tracts

A standard anesthesia protocol was followed. Patients were fasted for at least 6 h for solids and 4 h for liquids. Routine monitoring including pulseoximeter, noninvasive blood pressure monitor, Etco2 monitor were done.

Patients underwent intravenous induction with Propofol 2mg/kg, inj Fentanyl 2mcg/kg. Following induction, mask ventilation was performed until conditions suitable for device insertion [apnea and lack of response to jaw thrust, loss of eyelash reflex] were obtained .The sizes 3 and 4 were used in patients weighing 30-50kg and 50-70 kg respectively. Anaesthesia was maintained with N_2O: O_2 and Propofol according to patient response.

All techniques were performed in the sniffing position with the cuff fully deflated and using a midline or slight lateral approach. The posterior surface of the laryngeal mask airway was lubricated with a water soluble jelly. The tip of the index finger was placed on the point where the tube joins the mask. With the aperture facing forward the tip of the cuff was placed against the inner surface of the upper incisors or gums and inserted. Once the laryngeal mask airway was inserted into the pharynx the cuff fully was inflated with air until effective ventilation was established or the maximum recommended inflation volume (size 3-20 ml, size 4-30 ml) was reached. Fixation was according to the manufacturers instructions.

In I-gel, front, back and sides of the cuff were lubricated with water based jelly. The device was grasped along the integral bite block and was introduced into the mouth in the direction towards the hard palate and was glided downwards and backwards along the hard palate until definite resistance was felt.

Three attempts of device insertion were allowed before insertion was considered a failure. Failed insertion was defined by any of the following criteria.

1. Oropharyngeal impaction (failed passage into the pharynx)
2. Glottic impaction (airway obstruction, mid portion of bite block protruding from the mouth)
3. Mechanical airway obstruction (airway obstruction, mid portion of bite block between teeth, no improvement with Propofol,
4. Reflex airway obstruction [airway obstruction, mid portion of bite block between teeth, improvement with Propofol],
5. Folding over the cuff [clear airway, midportion of bite block protruding from the mouth, failure to insert the gastric tube] and
6. Inadequate seal [clear airway, mid portion of bite block between teeth, low airway pressure oropharyngeal air leak].

The time taken for successful placement was recorded. Oropharyngeal seal pressure was noted by closing the expiratory valve at a fixed gas flow of 5L per minute and recording the airway pressure at which the gas leaked into the mouth. At this point, gas leakage was heard at the mouth, at the epigastrium (epigastric auscultation) or coming out the drainage tube (I-gel group). Manometric stability test is one of the most reliable test.

The etiology of failed insertion was documented. If insertion failed

after three attempts a single attempt was permitted with the alternative technique.

Any episodes of hypoxia [spo2 <90%] or other adverse events were documented.

Any visible blood staining on the device was noted at removal. The mouth, lips and tongue were inspected for evidence of trauma.

Patients underwent a structured interview 8-24 hrs after surgery. Patients were asked about sore throat [constant pain/independent of swallowing], dysphonia [difficulty/pain during speaking] and dysphagia [difficulty/pain on swallowing] are recorded. All the results were tabulated and analyzed.

OBSERVATIONS AND RESULTS

Statistical Tools

The information collected regarding all the selected cases were recorded in a Master Chart. Data analysis was done with the help of computer using Epidemiological Information Package (EPI 2002) developed by Centers for Disease Control and Prevention (CDC), Atlanta for W.H.O.

Using this software, frequencies, percentage, range, mean, standard deviation, x^2 and 'p' values were calculated. A 'p' value less than 0.05 is taken to denote significant relationship.

Characteristics of cases studied

Group A - Patients in whom I-gel was used

Group B - Patients in whom laryngeal mask airway was used.

Table – 1: Age Distribution

Age group	GROUP A		GROUP B	
	No	%	No	%
20-30 years	6	15	7	17.5
31-40 years	10	25	10	25
41-50 years	17	42.5	11	27.5
51-60 years	7	17.5	12	30
Total	40		40	
Range	21 – 60 years		20- 60 years	
Mean	42.3		43.38	
S.D	10.86		11.2	
'p'	**0.6641 Not significant**			

The demographic data of the patients included in this study showed no significant difference between both groups in terms of age.

Table – 2: Sex

Sex	GROUP A		GROUP B	
	No	%	No	%
Male	3	7.5	3	7.5
Female	37	92.5	37	92.5
Total	40		40	
'p'	**1 not significant**			

The demographic data of the patients included in this study showed no significant difference between both groups in terms of sex of the patient.

Table – 3: Weight

Weight in kgs	GROUP A	GROUP B
Range	40- 59	40-58
Mean	49.73	49.6
SD	5.449	4.991
'p'	**0.9151 Not significant**	

The demographic data of the patients included in this study showed no significant difference between both groups in terms of weight

Table – 4 : LMA/ IGEL size

Size	GROUP A		GROUP B	
	No	%	No	%
	20	50	23	57.5
4	20	50	17	42.5
P	0.5073 Not significant			

The laryngeal mask airway sizes used were 57.5% in Size 3 and in 42.5% cases size 4 was used. In group I-gel size 3 was used in 50 % patients and size 4 used in50 % of patients .These differences were found to be statistically not significant.

Table 5: Number of Attempts

Number of Attempts	GROUP A		GROUP B	
	No	%	No	%
1	39	97.5	38	95
2	1	2.5	2	5
Total	40		40	
'p'	**0.5620 Not significant**			

Regarding the number of attempts for successful insertion in group A there was 97.5%success rate in first attempt and in group B there was 95 %

success rate of insertion in first attempt. This showed that there is no statistically significant difference between the groups

Table – 6: Time for insertion

Time for insertion	GROUP A	GROUP B
Range	14-21	20-30
Mean	16.3	24.53
SD	1.713	2.309
'p'	**<0.0001 Significant**	

Regarding the time for insertion group A the time was 16 s. In group B the insertion time was24 s. The difference in insertion time of 8s was found to be statistically significant.

Table – 7: Airway seal pressure

CM of H_2O	GROUP A		GROUP B	
	No	%	No	%
10-20	7	17.5	39	97.5
20-30	33	82.5	1	2.5
'p'	**<0.0001 significant**			

In the I-gel group the airway seal pressure achieved was superior when compared to laryngeal mask airway. These results were found to be statistically significant.

Table -8 Airway manipulation

GROUP A		GROUP B	
Needed	3	Needed	2
Not needed	37	Not needed	38
'p'	**0.6492 not significant**		

Airway manipulation was needed in 3 cases in I-gel group and in 2 cases in laryngeal mask airway group. These results were found to be statistically insignificant.

Table –9: Post operative airway morbidity

Post operative airway morbidity	Group A		Group B	
	No	%	No	%
Present	2	5	2	5
Absent	38	95	38	95
'p'	**1 Not significant**			

In I-gel group the incidence of airway morbidity was about 5%.In group laryngeal mask airway the incidence of airway morbidity was about 5%. These results were found to be statistically insignificant with a 'p' value of 1.

Table-10: Gastric tube insertion in I-gel

	Number	Percent
Success	36	90
Failure	4	10
Total	40	100

The success rate of gastric tube insertion was 90 % and failure rate was 10% in I-gel. In laryngeal mask airway there is no separate gastric tube channel. Hence, gastric tube insertion is not possible.

DISCUSSION

80 patients undergoing minor surgical procedures under total intravenous anaesthesia were taken up for the study. They were allocated into 2 groups of 40 each. In one group I-gel and in another group laryngeal mask airway was used as the supraglottic airway device.

INSERTION TIME

The time for insertion was 16 seconds with I-gel compared with 24 seconds with laryngeal mask airway. The additional 8 seconds is clinically and statistically significant. As no cuff inflation is needed in this device time required for insertion is shorter. In our study the insertion time was prolonged in laryngeal mask airway group and is consistent with the previous study done by Ashish Kannaujia Department of Anesthesia and critical Care, S.N.Medical College Agra and Amr M Helmy, Hossam M Atef, Ezzat M El Taher,Ahmed Mossad Henidak Department of Anaesthesia and Intensive Care, Ismailia, Egypt.

AIRWAY MANIPULATION

Airway manipulation in the form of increasing the depth of insertion was done in one case and in two cases the device was changed to larger size to achieve better seal in I-gel group. In laryngeal mask airway group in one case the depth of insertion was increased and in another case jaw thrust was done to assist easy insertion. This is comparable to the study

done by Ashish Kannaujia Department of Anesthesia and critical Care, S.N.Medical College Agra.

GASTRIC TUBE PLACEMENT

A well lubricated 60 cm long gastric tube [10 F for size 3, 12 F for size 4] was inserted through the drain tube if there was no air leak up to the drain tube. Correct gastric tube placement was assessed by suction of fluid or detection of injected air by epigastric stethoscope.

The success rate was 90 % for gastric tube insertion in I-gel group.

OROPHARYNGEAL SEAL PRESSURE

Oropharyngeal seal pressure was higher in I-gel group when compared to laryngeal mask airway group .This denotes I-gel has a better sealing pressure and it fits well with the laryngeal anatomy .This is similar to study conducted byJ.J.Catward, T.M.Cook, C.Seller, J.Handel, T.Simpson, V.Vanek and F.Kelly Department of anaesthesia ,Royal United Hospital, Combe Park, United Kingdom.

POSTOPERATIVE AIRWAY MORBIDITY

Patients were asked about sore throat [constant pain/independent of swallowing], dysphonia [difficulty/pain during speaking] and dysphagia [difficulty/pain on swallowing] and recorded **.**Regarding the postoperative airway morbidity there were 2 cases of airway morbidity in I-gel group compared with 2 cases in laryngeal mask airway group which is clinically

and statistically insignificant. In I-gel group one patient reported sore throat and another patient had pain on swallowing .In laryngeal mask airway group one patient had blood staining on device and another patient had sore throat. This finding was similar to the previous study done by Ashish Kannaujia Department of Anaesthesia and critical Care, S.N.Medical College Agra and Amr M Helmy, Hossam M Atef, Ezzat M El Taher, Ahmed Mossad Henidak Department of Anaesthesia and Intensive Care, Ismailia, Egypt.

ADVERSE RESPIRATORY EVENTS

No patients in any of the groups had any adverse respiratory event like episodes of hypoxia [spo2<90%] or laryngospasm.

SUMMARY

This study was conducted in the elective operation theatres of Government Rajaji hospital, attached to Madurai medical college. The aim of the study was to compare I-gel and laryngeal mask airway in patients undergoing minor surgical procedures under total intravenous anaesthesia. The study included 80 patients who underwent minor gynaecological procedures, orthopaedic and surgical procedures.

In group A (40 patients) I-gel was used. In group B (40 patients) laryngeal mask airway was used. Observations and recordings was done in both groups for number of attempts, insertion time, incidence of trauma, gastric tube placement, Oxygen saturation changes ,oropharyngeal seal pressure and postoperative airway morbidity. All the results were tabulated and analyzed.

To summarize my study findings the number of attempts required for insertion is equal for both laryngeal mask airway and I-gel groups. The insertion time is shorter in I-gel group when compared to laryngeal mask airway group. The oropharyngeal seal pressure was higher in I-gel than laryngeal mask airway group. The incidence of trauma and post operative airway morbidity are similar in both I-gel and laryngeal mask airway group.

CONCLUSION

To conclude, the insertion time of I-gel is shorter in comparison with laryngeal mask airway and the seal pressure achieved was better in I-gel group than laryngeal mask airway group.

The success rate of insertion, incidence of trauma and postoperative airway morbidity oxygen saturation are similar in both I-gel and laryngeal mask airway group.

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PROFORMA

COMPARATIVE STUDY OF I-GEL AND LARYNGEAL MASK AIRWAY IN PATIENTS UNDERGOING MINOR SURGICAL PROCEDURES UNDER TOTAL INTRAVENOUS ANESTHESIA.

NAME: AGE: S.NO: IP NO:

DIAGNOSIS:

PROCEDURE:

ASA PHYSICAL STATUS : I/ II

PATIENT CHARACTERISTICS

AGE:

WEIGHT:

GENDER:

PREOP ASSESMENT

AIRWAY - HR- BP- SPO2-

CVS- RS-

P/A- CNS- OTHERS-

PREMEDICATION : INJ. Glycopyrrolate 0 .2mg/kg

MONITORS:

PULSEOXIMETRY:

NIBP:

Etco2

INDUCTION DATA:

INTRAVENOUS – PROPOFOL 2mg/kgs

OPIOD - INJ FENTANYL [IN MICG]

INSERTION DATA

I-GEL/ LMA SIZE -3/4

TECHNIQUE - DIGITAL

I-GEL/ LMA INSERTION: SUCCESSFUL /FAILED

INSERTION TIME [IN SECONDS]:

NO OF ATTEMPTS: 1 / 2 / 3

AIRWAY MANIPULATION : NEEDED/NOT NEEDED

GASTRIC TUBE INSERTION: SUCCESSFUL /FAILED

HAEMODYNAMIC VARIABLES

OXYGEN SATURATION

BLOOD STAINING INDICATING TRAUMA- PRESENT/ABSENT

BLOOD STAINING ON I-GEL/ LMA: PRESENT/ABSENT

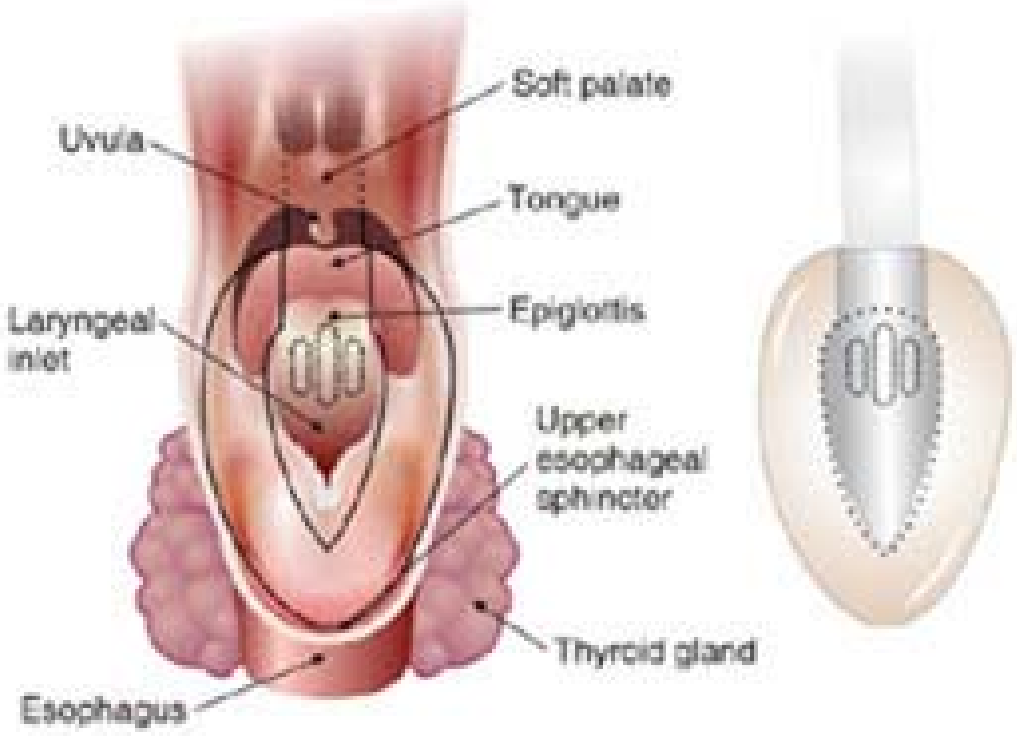
POSTOP AIRWAY MORBIDITY

DYSPHONIA: PRESENT/ABSENT

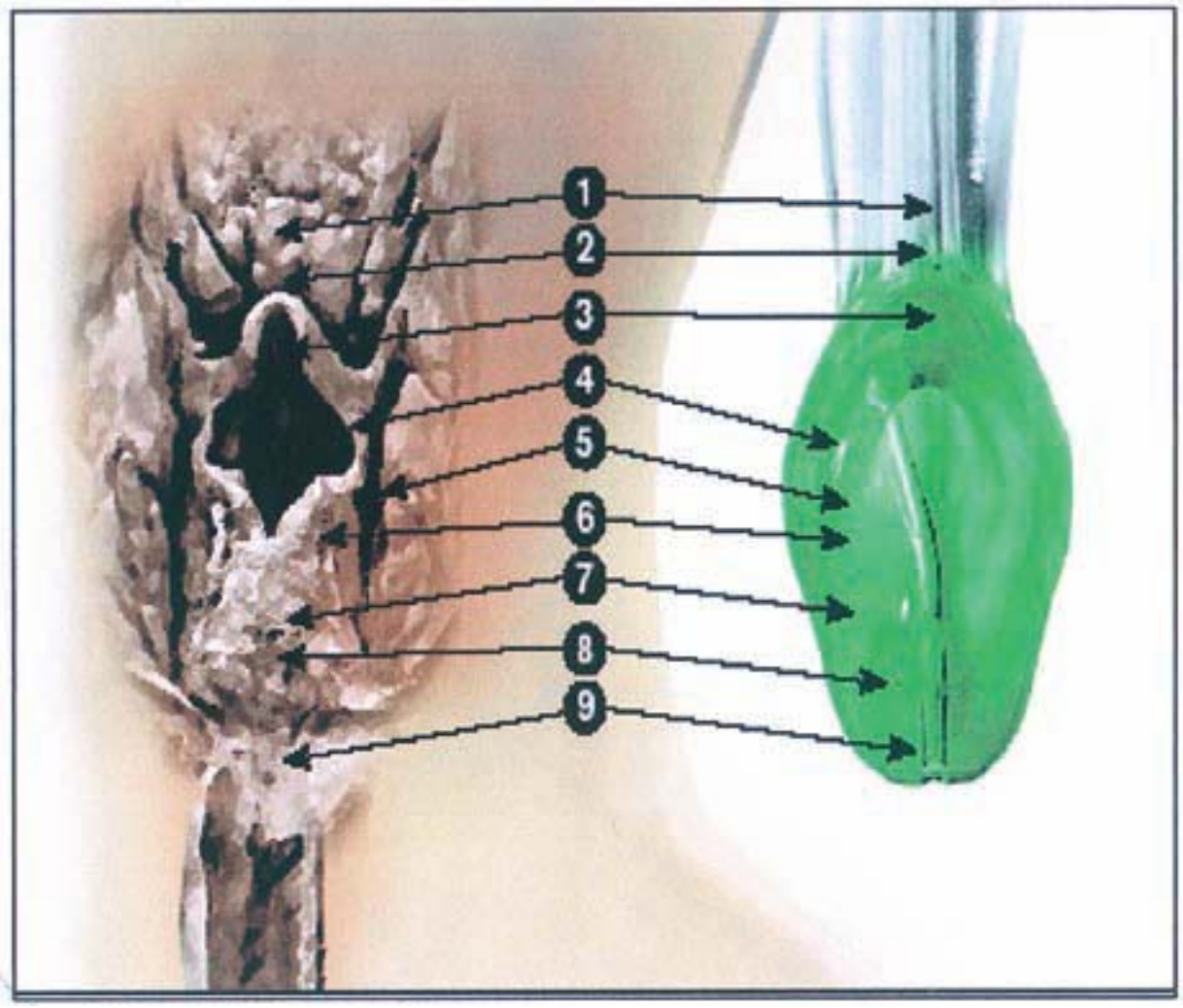
DYSPHAGIA: PRESENT/ABSENT

SORE THROAT: PRESENT/ABSENT

LARYNGEAL MASK AIRWAY IN POSITION

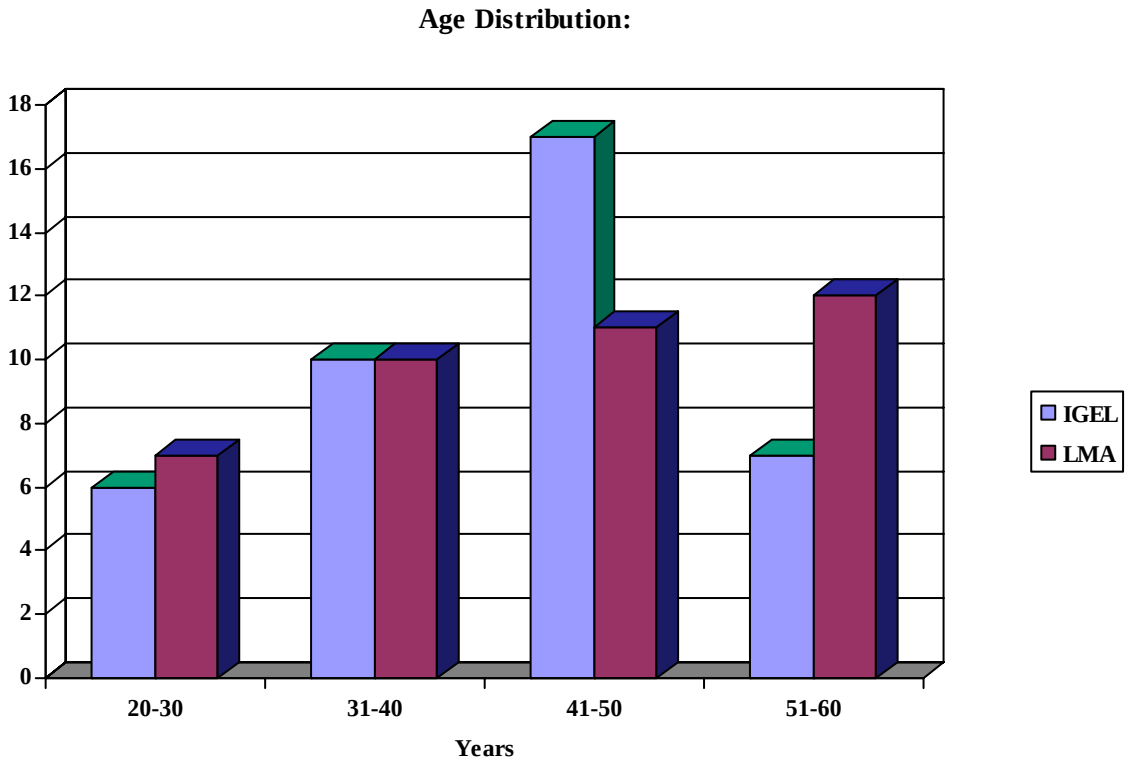


View of the I-gel cuff in relation to the laryngeal framework



1. Tongue
2. Base of tongue
3. Epiglottis
4. Aryepiglottic folds
5. Piriform fossa
6. Posterior cartilages
7. Thyroid Cartilage
8. Cricoid cartilage
9. Upper oesophageal opening

AGE DISTRIBUTION



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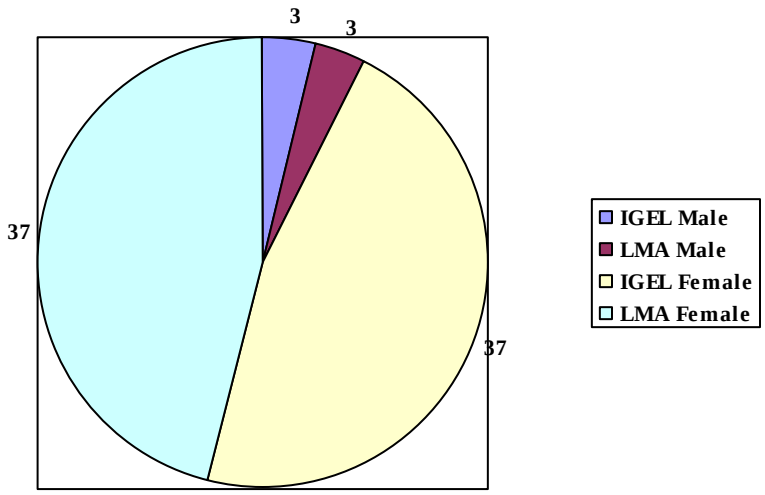
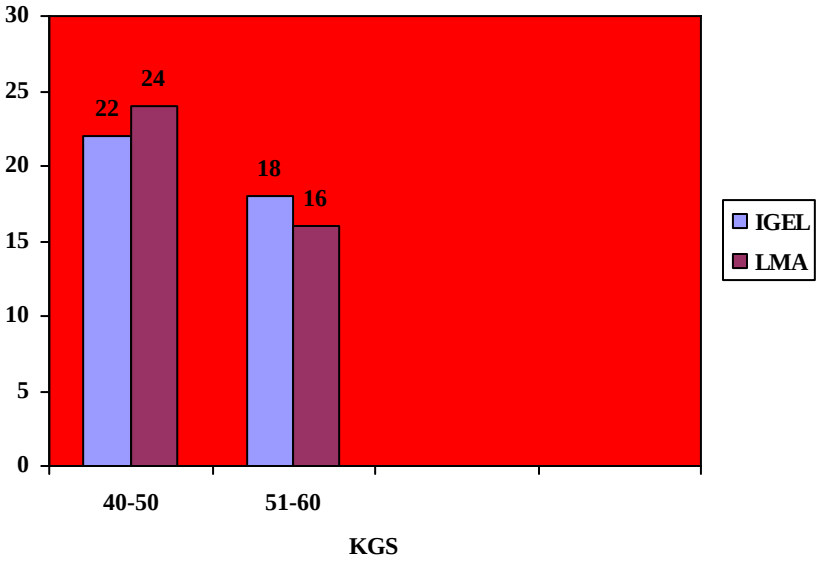
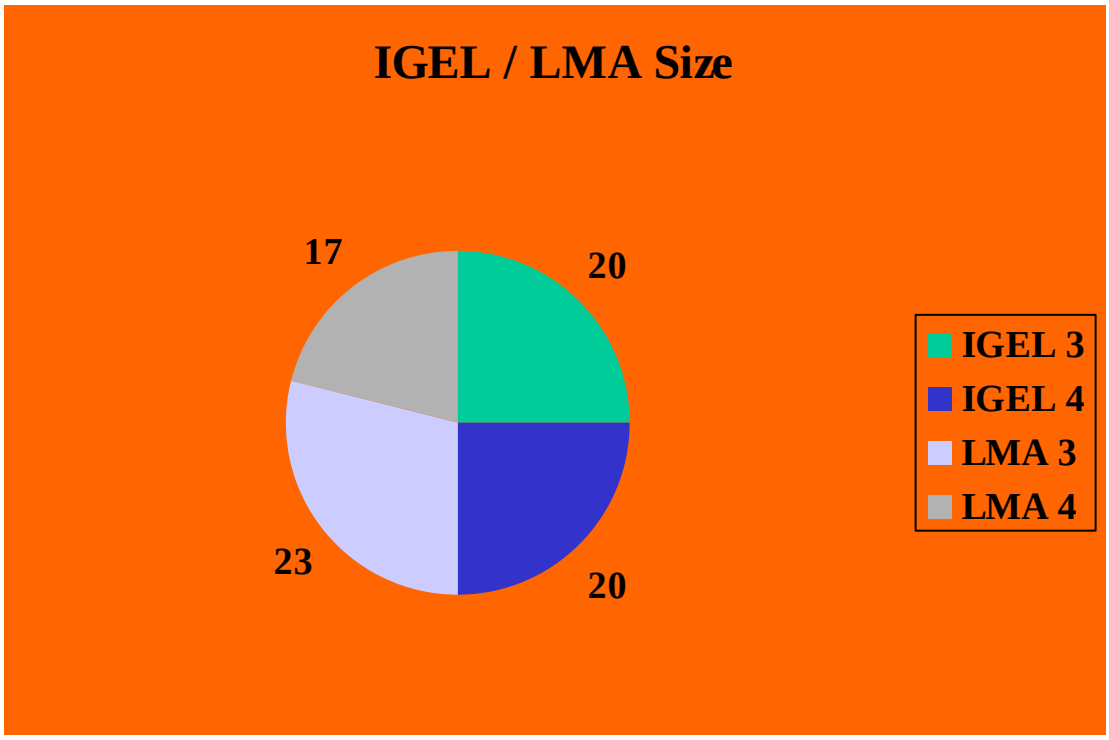
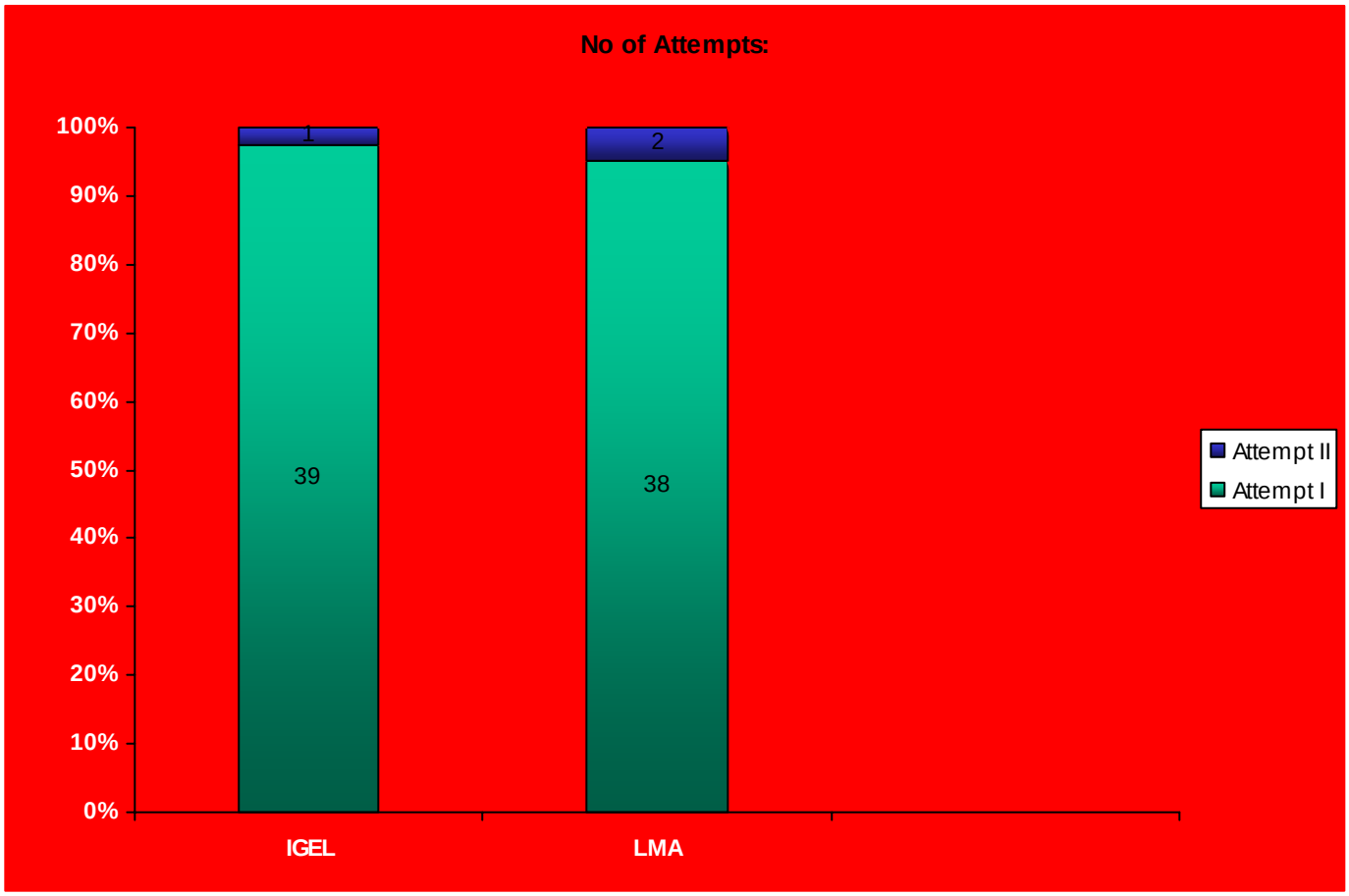
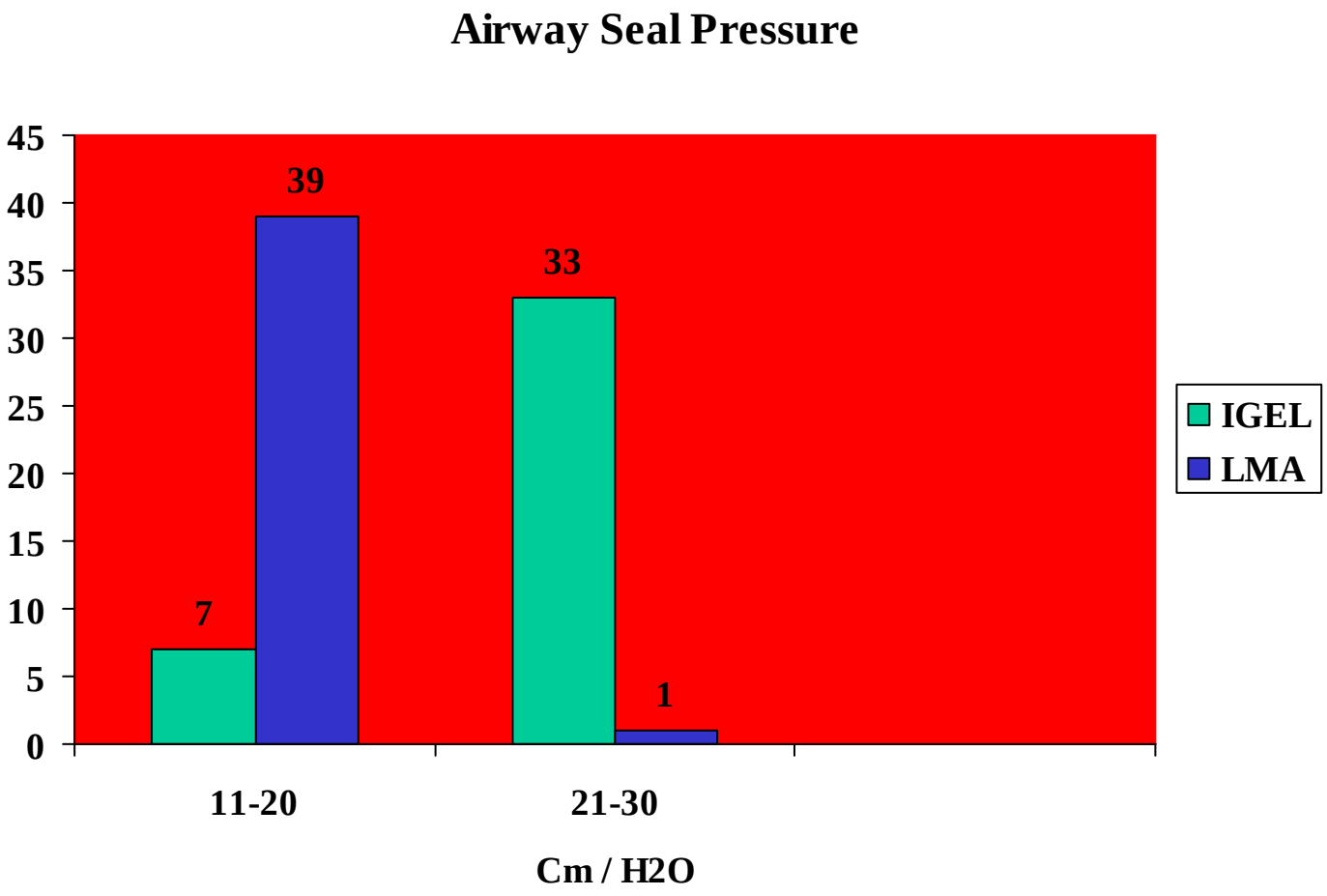


Weight Distribution:

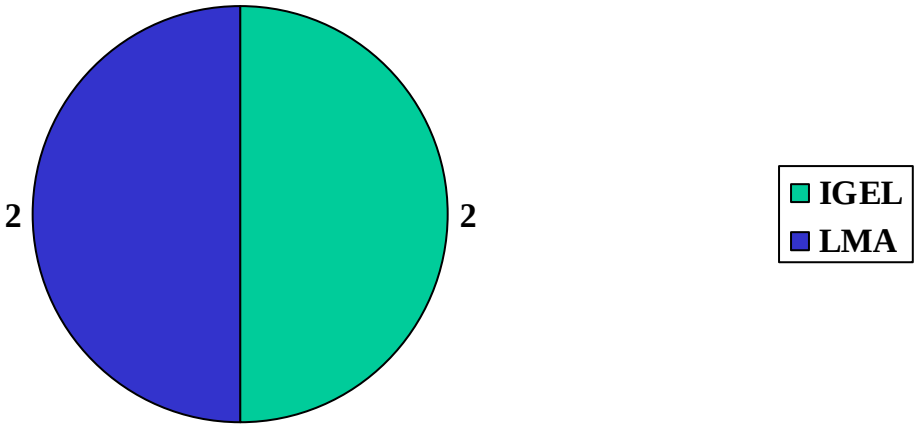



IGEL / LMA Size
17
20
23
20
IGEL 3
IGEL 4
LMA 3
LMA 4


No of Attempts:
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1
2
39
38
IGEL
LMA
Attempt II
Attempt I


Airway Seal Pressure
45
40
35
30
25
20
15
10
5
0
39
33
7
1
11-20
21-30
Cm / H2O
IGEL
LMA

Post Op Morbidity



MASTER CHART I-GEL

	NAME	GROUP	AGE	SEX	WEIGHT	SIZE	ATTEMPTS	TIME FOR INSERTION	AIRWAY MANIPULATION	SEAL PRESSURE	POSTOP MORBIDITY	SPO2
1	Lakshmi	A	50	f	45	3	2	16s	not needed	26	absent	99
2	Sangeetha	A	21	f	50	4	1	14s	not needed	18	absent	98
3	chellammal	A	50	f	42	3	1	15s	not needed	24	absent	99
4	ponnupillai	A	49	f	48	3	1	16s	not needed	20	absent	98
5	panchu	A	35	f	55	4	1	14s	not needed	20	absent	98
6	leelavathy	A	52	f	58	4	1	17s	not needed	22	absent	99
7	prema	A	35	f	57	4	1	15s	not needed	20	absent	100
8	rajam	A	50	f	46	3	1	18s	not needed	18	absent	99
9	selvi	A	41	f	43	3	1	16s	not needed	26	absent	98
10	vairamani	A	24	f	51	4	1	15s	not needed	28	absent	99
11	kasiammal	A	39	f	42	3	1	15s	not needed	24	absent	98
12	indhirani	A	49	f	56	4	1	16s	not needed	26	absent	98
13	parvathy	A	47	f	59	4	1	18s	not needed	24	present	99
14	valliammai	A	60	f	53	4	1	15s	not needed	22	absent	98
15	sheeladevi	A	21	f	51	4	1	16s	not needed	26	absent	99
16	mariammal	A	35	f	49	3	1	18s	not needed	24	absent	98
17	nagaratinam	A	37	f	56	4	1	20s	needed	24	absent	98
18	muthu	A	24	f	55	4	1	16s	not needed	26	absent	99
19	saravanamuthu	A	45	m	43	3	1	18s	not needed	24	absent	98
20	saroja	A	50	f	46	3	1	16s	not needed	22	absent	99

MASTER CHART I-GEL

	NAME	GROUP	AGE	SEX	WEIGHT	SIZE	ATTEMPTS	TIME FOR INSERTION	AIRWAY MANIPULATION	SEAL PRESSURE	POSTOP MORBIDITY	SPO2
21	maragadam	A	45	f	52	4	1	15s	not needed	20	absent	100
22	paramasakthi	A	36	f	48	3	1	16s	not needed	26	absent	99
23	rajammal	A	60	f	57	4	1	18s	not needed	24	absent	98
24	petchiammal	A	57	f	43	3	1	16s	not needed	22	absent	98
25	saraswathi	A	60	f	49	3	1	16s	not needed	24	absent	99
26	meena	A	52	f	53	4	1	14s	not needed	26	absent	98
27	rajammal	A	43	f	45	3	1	16s	not needed	26	absent	99
28	mookkammal	A	50	f	50	4	1	18s	not needed	22	absent	98
29	alagi	A	40	f	55	4	1	16s	not needed	24	present	99
30	sivamayil	A	35	f	44	3	1	15s	not needed	26	absent	100
31	ashok kumar	A	22	m	56	4	1	14s	not needed	24	absent	99
32	madavi	A	38	f	42	3	1	16s	not needed	22	absent	99
33	ammaiammal	A	43	f	47	3	1	18s	not needed	24	absent	99
34	jaheer	A	42	f	45	3	1	16s	not needed	22	absent	99
35	rani	A	42	f	56	4	1	20s	needed	26	absent	98
36	sundaravalli	A	60	f	45	3	1	14s	not needed	22	absent	98
37	muniyammal	A	28	f	56	4	1	15s	not needed	20	absent	99
38	amsavalli	A	42	f	53	4	1	16s	not needed	24	absent	99
39	anandi	A	40	f	48	3	1	18s	not needed	22	absent	99
40	kannan	B	43	m	40	3	1	21s	needed	26	absent	98

MASTER CHART LMA

	NAME	GROUP	AGE	SEX	WEIGHT	SIZE	ATTEMPTS	TIME FOR INSERTION	AIRWAY MANIPULATION	SEAL PRESSURE	POSTOP MORBIDITY	SPO2
41	arumugam	B	58	f	45	3	1	20s	not needed	16	absent	99
42	gayathri	B	49	f	49	3	1	22s	not needed	18	absent	100
43	kumutha	B	43	f	55	4	1	24s	not needed	16	absent	99
44	rathnavalli	B	55	f	54	4	2	26s	not needed	18	absent	98
45	pandiammal	B	40	f	47	3	1	22s	not needed	20	absent	99
46	panchavarnam	B	40	f	49	3	1	20s	not needed	16	absent	98
47	surya	B	28	f	54	4	1	24s	not needed	18	absent	98
48	saroja	B	55	f	40	3	1	22s	not needed	20	absent	99
49	pushpavalli	B	55	f	54	4	1	24s	not needed	22	absent	99
50	karupayee	B	60	f	48	3	1	26s	not needed	16	present	98
51	devaki	B	40	f	42	3	1	25s	not needed	16	absent	99
52	papathi	B	49	f	47	3	1	22s	not needed	18	absent	98
53	nagarani	B	32	f	56	4	1	24s	not needed	16	absent	99
54	siva	B	33	m	49	3	1	26s	not needed	18	absent	98
55	amutha	B	42	f	52	4	1	28s	not needed	18	absent	99
56	mariammal	B	35	f	46	3	1	24s	not needed	20	absent	99
57	muthulakshmi	B	57	f	50	4	1	26s	not needed	16	absent	98
58	manikkammal	B	52	f	45	3	1	28s	not needed	18	absent	99
59	muthumani	B	27	f	46	3	1	24s	not needed	16	absent	98
60	petchi	B	38	f	55	4	1	23s	not needed	18	absent	99

MASTER CHART LMA

	NAME	GROUP	AGE	SEX	WEIGHT	SIZE	ATTEMPTS	TIME FOR INSERTION	AIRWAY MANIPULATION	SEAL PRESSURE	POSTOP MORBIDITY	SPO2
61	vellakannu	B	60	m	42	3	1	23s	not needed	18	absent	98
62	indira	B	48	f	47	3	1	25s	not needed	16	absent	98
63	seeniammal	B	55	f	58	4	1	22s	needed	20	absent	98
64	Lakshmi	B	50	f	56	4	2	24s	not needed	18	absent	99
65	manikkam	B	52	f	46	3	1	30s	needed	16	absent	98
66	lingamal	B	60	f	48	3	1	28s	not needed	18	absent	100
67	rajammal	B	46	f	53	4	1	25s	not needed	16	absent	99
68	maniyammal	B	35	f	55	4	1	22s	not needed	16	absent	98
69	fathima	B	38	f	49	3	1	24s	not needed	18	absent	98
70	rukku	B	26	f	40	3	1	26s	not needed	16	absent	99
71	nagajothi	B	45	f	51	4	1	24s	not needed	18	absent	98
72	jayashri	B	20	f	56	4	1	24s	not needed	16	absent	99
73	ramalakshmi	B	45	f	48	3	1	26s	not needed	20	absent	98
74	mookammal	B	55	f	46	3	1	24s	not needed	18	present	99
75	ramalakshmi	B	45	f	49	3	1	25s	not needed	16	absent	98
76	kanchanadevi	B	26	f	56	4	1	22s	not needed	16	absent	99
77	dhanalakshmi	B	30	f	47	3	1	26s	not needed	18	absent	98
78	sivanthi	B	38	f	42	3	1	29s	not needed	16	absent	98
79	velathai	B	48	f	57	4	1	24s	not needed	18	absent	99
80	manipandi	B	25	m	55	4	1	28s	not needed	16	absent	99